National Institute of Environmental Health Sciences

Short-term effects of ozone air pollution on ischaemic stroke occurrence: A case-crossover analysis from a 10-year population-based study in Dijon, France

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Abstract:

Objective: To evaluate the association between air pollutants and the occurrence of acute stroke from 10-year population-based study. Methods: The daily stroke count was obtained from Dijon Stroke Register between March 1994 and December 2004. The register recorded all first-ever strokes among residents of Dijon (150 000 inhabitants) in France, using standard diagnostic criteria. Pollutant concentrations (SO2, CO, NO2, O3 and PM10) were measured hourly. A bi-directional case-crossover design was used to examine the association between air pollutant and stroke onset. The conditional logistic regression model included the meteorological parameters (temperature, relative humidity), influenza epidemics and holidays. Results: The authors collected 493 large artery infarcts, 397 small artery infarcts, 530 cardio-embolic infarcts, 67 undeterminate infarcts, 371 transient ischaemic attacks and 220 haemorrhagic strokes. For single-pollutant model and for a 10 mg/m3 increase of O3 exposure, a positive association was observed only in men, over 40 years of age, between ischaemic stroke occurrence and O3 levels with 1-day lag, (OR 1.133, 95% CI 1.052 to 1.220) and 0-day lag (OR 1.058, 95% CI 0.987 to 1.134). No significant associations were found for haemorrhagic stroke. In two-pollutant models, the effects of O 3 remained significant after each of the other pollutants were included in the model, in particular with PM10. A significant association was observed for ischaemic strokes of large arteries (p Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 0.02) and for transient ischaemic attacks (p Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 0.01). Moreover, the authors found an exposure-response relations between O3 exposure and ischaemic stroke (test for trend, p Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 0.01). An increase in association in men with several cardiovascular risk factors (smoker, dyslipidemia and hypertension) was also observed. Conclusion: These observational data argue for an association between ischaemic stroke occurrence and O3 pollution levels; these results still need to be confirmed by other studies.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Meteorological Factors, Temperature

Air Pollution: Interaction with Temperature, Ozone, Particulate Matter, Other Air Pollution

Air Pollution (other): CO; NOx; SO2

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Country

Other European Country : France

Health Co-Benefit/Co–Harm (Adaption/Mitigation):

specification of beneficial or harmful impacts to health resulting from efforts to reduce or cope with greenhouse gases

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Health Impact:

specification of health effect or disease related to climate change exposure

Cardiovascular Effect

Cardiovascular Effect: Stroke

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

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